LIBRARY
RECEIVED
★ MAY 25 1936 ★
U. S. Department of Agriculture

# THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

Volume XX Number 9

May 15, 1936

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XX May 15, 1936 Number 9

IN THIS ISSUE

J. G. Gaines reports the diseases observed in a survey of tobacco seedbeds in Georgia, page 142.

The occurrence of tomato spotted wilt in Utah under conditions suggesting seed transmission is discussed by H. L. Blood, page 143.

Diseases were conspicuous by their absence this year in early plantings of peas in Mississippi, according to Paul R. Miller, page 144.

Nematode damage to alfalfa in Arizona is reported by D. C. George, page 145.

The results of peach orchard inspection for virus diseases in Michigan last year are reported on page 145.

So far this year very little peach leaf curl has developed in Illinois, according to G. H. Boewe, page 147.

Reports on apple scab are given from Massachusetts, New York and Illinois, page 147.

Winter injury to fruit trees in Illinois is reported by H. W. Anderson, page 149.

The progress of the Dutch elm disease eradication is shown on page 150.

Some interesting new records from the West are reported by Roderick Sprague and by S. M. Zeller, page 151.

The tomato leaf mold fungus is reported as a cause of asthma by E. F. Guba, page 151.

Miscellaneous reports, page 152, include wheat mildew, loose smut of oats, blight of apple and pear, and cherry leaf spot.

R. P. White wants cultures and fresh material of Cloeosporium and Colletotrichum, page 152.

April weather, page 152.

# SURVEY OF TOBACCO PLANTBED DISEASES IN GEORGIA, 1936

J. G. Gaines

The 1936 season was less favorable for tobacco seedlings than the preceding one in that severe freezes took heavy toll and downy mildew was more prevalent. The winter was the coldest in the history of the flue-cured tobacco industry at Tifton. At least 20 percent of the Georgia tobacco plants were estimated to have been killed by freezes and wet weather during January and early February. Fortunately good stands were secured initially in most beds so that the losses were not so keenly felt as they might otherwise have been.

Downy mildew (Peronospora tabacina) made its appearance the last week in February and remained more or less active for a period of at least nine weeks, or until after the close of a prolonged transplanting season. Seedlings were small in some of the first beds affected and losses up to 50 percent were observed here, while in one instance more than 80 percent of the plants were killed. On the whole, however, the kill probably did not exceed 5 percent, the chief damage arising from a delay of about a week in transplanting. As in previous seasons symptoms did not become widespread until seedlings were almost large enough to put in the field, this stage being reached the last week in March this year.

As in 1935, damping-off (Rhizoctonia sp. and Pythium sp.) developed early in the plantbed season during a few warm days in January and when the seedlings were quite small. Infections were not serious generally and only a small percentage of observed beds were affected. Losses due to damping-off were negligible.

Frenching (non-parasitic) made its appearance in a steam sterilized late seedbed at Tifton the last week in April, affecting 4 percent of the plants. This was the second time in six years that this abnormality was observed in a Georgia plantbed. In 1933 several frenched plants were found in a similarly late bed in the same locality. In both instances the soil had been steamed and well fertilized, and the beds were in a dry location.

Mosaic (virus) was not seen in Georgia plantbeds during the 1936 season until after the crop had been put in the field.

Root knot (Heterodera marioni) was visible to a limited extent in a small percentage of beds late in the transplanting season. Symptoms were confined to old locations.

# AN UNUSUAL OCCURRENCE OF "SPOTTED WILT" OF TOMATO IN UTAH

H. L. Blood

In 1935 two lots of tomato seed from a canker-infested field, one extracted with, and the other without, fermentation, were provided by the pathologists of the California Agricultural Experiment Station to be grown in Utah to study the effectiveness of the fermentation seed extraction method as a control for bacterial canker on seed produced in California. The seed was planted in greenhouse flats and grown under the same conditions as the seed used in the local fermentation studies. During the course of the summer 192 or 25.9 percent of the 741 plants grown from the California seed developed a disease resembling "Die Back" or "Spotted Wilt" of the tomato as it had been observed in California.

The diseased condition was first observed as an extensive streak necrosis of the stem tips and a spot necrosis of the young tip leaves. The necrosis on stems and leaves gradually expanded until the streaks and spots coalesced and killed the growing portions of the plant. Many fruits borne on infected plants exhibited a characteristic concentric ringed type of mottling which destroyed their commercial value. Infected plants remained dwarfed and unproductive throughout the season but did not die.

The disease was first noticed in the early stages of development about one month after the plants were set in the field. All but 12 of the 192 plants ultimately developing the disease showed evidence of infection soon after the disease was first observed in the field. The other 12 plants developed the disease as the season advanced. During the summer the disease appeared on a few plants, grown from eastern seed and from local seed, planted in the same field. The frequency of occurrence among such plants did not average more than 1 to 2 percent and was most abundant adjacent to the California stock indicating a possible field spread.

The occurrence of the disease in this manner suggests seed transmission although such a conclusion can only be speculative until further studies have been made. The extent of the infection among the plants grown from the California seed; the apparent absence of a comparable degree of infection among the plants grown in the greenhouse adjacent to and under the same conditions as the California plants; and the distribution of infected plants in the field indicating spread from the concentration of the disease in the California stock, point to the seed as the probable source of infection.

This same disease has been observed in Utah tomato fields every year for the past four years. Never more than a trace of the disease has made its appearance in any one field and only an occasional field has been

infested. The comparative frequency with which the disease has made its appearance during the past few years has left the impression that it is increasing in prevalence but as yet has not reached serious proportions. (Division of Fruit and Vegetable Crops and Diseases).

## DISEASES RARE IN EARLY PLANTINGS OF ENGLISH PEAS IN MISSISSIPPI, 1936

Paul R. Miller

Copiah County, in south central Mississippi, grew approximately 1500 acres of English peas this season. By the end of this week there will have been about 200 car lots shipped to various points in the Mid-west and to the East from the two shipping points, Crystal Springs and Hazlehurst. Most of these peas are grown on a red-clay type of soil and as this soil is not very fertile the majority of growers apply about 1200 pounds of 4-8-4 fertilizer per acre. Two unusual weather conditions occurred which probably reduced the yield by 25 to 35 percent. The rainfall for March was 3.84 inches below normal. During the first twenty-seven days of April there was only 1.38 inches, but 5.45 inches fell on April 28, 29 and 30, which helped to a certain extent the late crop. Frost occurred April 7, 8 and 9, just about the time the peas were in full bloom and this caused considerable shedding of the flowers.

The most conspicuous thing about pea diseases was their almost complete absence. Numerous representative fields were selected and thoroughly surveyed for diseases, without a trace of any leaf spot--bacterial, virus, or fungal in origin--being observed. Neither did any plants observed show evidence of root rot or wilt. An occasional pod which was touching the soil was found to be infected with either powdery mildew (Erysiphe polygoni) or Rhizoctonia (Corticium vagum). An excellent opportunity to see large quantities of peas at the shipping points was afforded as all of them are federally inspected and graded. In no case was a lot of peas placed in an off grade because of diseases, but some were rejected due to over maturity, "pops" (less than three peas in a pod) and to "flats" (unfilled pods). (Division of Mycology and Disease Survey, May 6.)

## STEM NEMATODE CAUSING DAMAGE TO ALFALFA IN ARIZONA

Stems of alfalfa plants, collected near Pima, April 17, were sent in by Mr. D. C. George of the Arizona Commission of Agriculture and Horticulture, with the query whether the nematode that was apparently responsible for the damage described in the quotation from his letter was the stem nematode. He writes as follows (April 24):

"This collection was made by Mr. W. T. Mendenhall, our district inspector, who is located at Safford. The specimens were taken from a field two miles south of Pima. The field, which is about twenty acres in extent, was planted to alfalfa three years ago this spring. During the summer season of 1935 a great many plants were observed in a dead and dying condition, but no close observations were made until early this season when the owner called upon Mr. Mendenhall for an investigation. According to Mr. Mendenhall's report, about two-thirds of the stand in this particular field has been killed by the infection. The same trouble is found in some of the adjacent fields but is not of such a serious nature as it is in this one.

"Last fall, and during the winter months, a great amount of flood water from the Gila River was used to irrigate the fields in question. This flood water carries a great amount of silt and the farmers were of the opinion that some relation existed between the muddy water and the death of the alfalfa plants."

The specimens were submitted to Dr. G. Steiner of the Division of Nematology, who reports:

"The alfalfa sample is infested by the bulb or stem nematode, Anguillulina dipsaci, and, in addition, there is a heavy infestation of Cephalobus elongatus. It is possible that the infestation came about through the flood waters of the Gila River, as suggested in the letter."

## PEACH VIRUS DISEASES IN MICHIGAN IN 1935

The following summary of inspections for peach yellows, little peach, red suture, and rosette is compiled from a mimeographed report issued by the Michigan State Department of Agriculture Orchard and Nursery Inspection Service, E. C. Mandenberg in charge. The report emphasizes the fact that only a very small percentage of the peach orchards of the State were included in this inspection, especially in the important fruit growing district of the southwestern area.

Table 12. Summary of inspections for peach virus diseases in Michigan in 1935.

| County | Number of farms | Number of peach trees examined | Number of peach trees with | | | |
|---|---|---|---|---|---|---|
| | | | Yellows | Littles | Red Suture | Rosette |
| Allegan | 45 | 21,845 | 33 | 63 | 380 | |
| Berrien | 911 | 475,303 | 137 | 8,525 | 2,225 | 13 |
| Kalamazoo | 45 | 10,162 | | | | |
| Kent | 129 | 80,689 | 35 | 248 | 383 | |
| Leelanau | 157 | 977 | | | | |
| Mason | 6 | 2,483 | 15 | 133 | | |
| Oakland | 11 | | | | | |
| Oceana | 22 | 11,902 | | 109 | | |
| Ottawa | 65 | 36,106 | 4 | 235 | 556 | |
| VanBuren | 93 | 62,946 | 129 | 808 | 413 | |
| Washtenaw | 12 | 14,236 | | | | |
| Total | 1,479 | 716,649 | 353 | 10,121 | 3,957 | 13 |

Table 13. Summary of 1935 peach virus disease inspections in Michigan, by varieties.

| Variety | Total number of trees | Number of peach trees with | | | |
|---|---|---|---|---|---|
| | | Yellows | Littles | Red Suture | Rosette |
| Banner | 5,331 | 3 | 43 | 130 | |
| Captain Ede | 4,198 | 2 | 37 | | |
| Carman | 1,817 | | 27 | 20 | |
| Crawford | 3,361 | | 24 | 75 | |
| Dewey (Admiral) | 1,435 | 2 | 13 | 3 | |
| Elberta | 370,798 | 176 | 7,379 | 2,174 | 4 |
| Engles Mammoth | 2,801 | | 46 | 14 | |
| Fitzgerald | 217 | | | | |
| Gold Drop | 8,534 | 4 | 159 | 55 | |
| Golden Jubilee | 922 | | | | |
| J. H. Hale | 49,303 | 7 | 359 | 26 | 3 |
| Hale Haven | 2,870 | | | | |
| Halberta | 1,686 | | 12 | 3 | |
| Kalamazoo | 7,377 | | 191 | 155 | |
| Lemon Free | 1,014 | | 8 | 12 | |
| Oriole | 435 | | | | |
| Prolific | 8,025 | 7 | 229 | 86 | |
| Rochester | 34,142 | 12 | 453 | 158 | 1 |
| South Haven | 82,856 | 21 | 626 | 266 | 5 |
| Sunglow | 2,180 | 4 | | 8 | |
| St. Johns | 1,239 | | 15 | 2 | |
| Wilma | 3,228 | | 24 | | |
| Miscellaneous | 122,880 | 115 | 476 | 770 | |

## PEACH LEAF CURL IN ILLINOIS

G. H. Boewe

During the week of April 20, 28 peach orchards containing 21,085 trees were examined in southern Illinois for leaf curl (Taphrina deformans). Although the trees were sufficiently well developed to show infection, leaf curl was found in only two small, unsprayed plantings in Pulaski County. In one, 56 percent of the trees and 0.3 percent of the leaves, in the other 53 percent of the trees and only a trace of the leaves, were diseased. While infection was found only on unsprayed trees, seven other orchards known to have received no dormant treatment were free of the disease. Last year leaf curl had reached the epidemic state by the week of April 8, in Massac and Pulaski counties. Whether the prevalence of leaf curl will be negligible this year or its development is delayed by the cool weather of the past month is not yet apparent. (Section of Applied Botany and Plant Pathology, Illinois State Natural History Survey.)

## FURTHER REPORTS ON APPLE SCAB

MASSACHUSETTS: The warm, wet weather in March, following the disappearance of the snow, hastened the maturity of scab spores in the old leaves in all orchards of the State, while fruit buds underwent only slight development during the same period. By the time fruit buds reached the delayed-dormant stage, that is with green tips exposed up to 1/4 inch, around 60 percent of the ascospores had already been shot from the old leaves, with no opportunity for infection.

When orchards were ready for the pink spray (May 5 to 9), following the rains of April 28 to 30 and May 3 to 4, there were very few spores left in the old leaves, the estimated percentage varying from 0.5 to 1 percent in most orchards up to perhaps 5 percent in certain localities.

This means, of course, that even though the blossom and subsequent periods should be unusually wet, the danger of scab infection from the old leaf material would be considerably less than even in the average season.

Infection Periods to Date: The prolonged rainy period of April 15 to 16 was ideal for the discharge and germination of ascospores. The more advanced orchards of McIntosh were showing prominent green leaf-tips, with an occasional leaf expanding, - the typical delayed dormant bud stage. With scab so active, it was suspected that infection might occur at this time judging from its customary behavior under similar conditions in other sections of the country. However, careful search

has revealed no scab spots on the foliage that could be attributed to that infection period except a single instance on a crabapple tree (in Wilmington on May 7). (O. C. Boyd, May 12.)

NEW YORK: The following reports are taken from the State College of Agriculture Departments of Entomology and Plant Pathology Weekly News Letter for the dates indicated.

Ulster County (C. G. Small, May 4). Found first lesions of apple scab May 1 on the first leaves of crab apple. The lesions were large enough to be easily distinguishable without a lens and were fairly easy to find. Noted only one lesion per leaf.

McIntosh leaf samples indicate a light discharge of ascospores occurred thruout the western New York fruit belt during the rains of the past week. (W. D. Mills, May 4.)

Dutchess County (J. A. Evans, May 4). Apple scab lesions observed on the underside of the rosette leaves surrounding the blossom bud clusters on Baldwin on May 1.

Wayne County (M. E. Buckman, May 4). Trap slides in orchards showed moderate discharge of apple scab spores April 30.

Orange County (K. E. Brown, May 11). Scab lesions found on crab apple on May 4. Lesions small and on early leaves. Scab lesions on unsprayed trees on May 7 mostly on tips of first leaves. Tips dying back. Scab lesions on crab on May 8 well developed on both early and later leaves. As many as six lesions on larger leaves. Wetting period over the week end of May 3 long enough to cause scab infection at prevailing temperatures.

Rockland County (W. J. Clark, May 11). Without much doubt the first major shoot of scab took place during the continuous thunder showers on May 3. The apple foliage was wet from 3 P. M. May 3 to 12 noon May 4. Apple scab lesions found on crab apple leaves, first series on May 2. Since then have found lesions on primary leaves of Baldwins.

Columbia County (S. R. Shapley, May 11). Slight scab infection has been noted on the first cluster leaves of unsprayed McIntosh and light infection on unsprayed crab apples.

Dutchess County (J. A. Evans, May 11). Apple scab lesions are not readily found.

Ulster County (C. G. Small, May 11). Have not yet been able to find any apple scab in sprayed orchards.

ILLINOIS: Mature ascospores were found at Urbana by March 15. About 1 percent of asci showed brown spores on this date. In spite of a very severe scab season in 1935 few perithecia could be found in the spring of 1936. Very little discharge of ascospores took place during late March and early April, due to weather conditions. Rains occurred only during very cold weather and were followed by temperatures near freezing until the leaves died out. Frequent high winds dried the foliage rapidly. During the last two weeks of April dry weather prevailed and in most sections of the State the expected prebloom infection was very light. Scab on leaves was not observed on check plots in southern Illinois until May 2 and very few spots were found on that date.

During the last few days of April and on May 1 and 2, heavy rains occurred in many sections of the State. At this time the perithecia were crowded with asci, with from 80 to 90 percent of the ascospores mature. Very heavy discharge took place at this time. As expected, scab is showing in abundance on unsprayed trees at this date (May 9). Most growers remembering their experience in 1935 have maintained a coverage from the time the buds opened. The calyx spray had been applied in southern Illinois previous to the rains and good control was probably secured. In the central section the second cluster bud spray probably gave good protection since the heavy rains occurred during full bloom and were followed rather soon with several days of hot dry weather. (H. W. Anderson, May 9).

## WINTER AND FREEZING INJURY TO FRUIT IN ILLINOIS

H. W. Anderson

You might be interested in knowing the winter injury conditions in this State. Peaches suffered more severely than any other fruit crop, as usual. In the area north of a line running east from St. Louis, the weak trees were entirely killed. The remainder of the trees showed very severe injury with only tufts of leaves here and there. This indicated a severe bud injury aside from wood injury. This bud injury probably occurred this spring when we had temperatures around 20 degrees after the buds had started. In fact, at this time the fruit was in bloom in southern Illinois. There is some question as to how many of these trees will survive. South of the line indicated above, the injury was more or less local, some orchards showing very little bud injury, while others were severely weakened.

Leaf injury to apples at the time of this spring freeze is indicated by the blistering and crinkling of the first leaves. Our apple crop was light and the additional injury from the freeze has certainly reduced the prospects of the crop. In some cases the apples seemed to start to develop and then dropped off. In one Winesap orchard which had almost a full bloom, there is no prospect at all now of a crop. The dates when we had the low spring temperatures were April 4 and 5. (Illinois Agricultural Experiment Station, May 12).

## DUTCH ELM DISEASE ERADICATION

A modification of the Dutch elm disease quarantine regulations, effective April 1, 1936, adds to the regulated area, 7 townships in Hunterdon County; 1 township in Middlesex County; 3 townships in Monmouth County; 2 townships in Morris County; 5 townships in Sussex County, and 8 townships in Warren County, in the State of New Jersey. It also adds 7 towns in Orange County; 4 towns in Putnam County, and 2 towns in Westchester County, New York.

The regulated area now includes:

In Connecticut:--Towns of Darien, Fairfield, Greenwich, New Canaan, Norwalk, Stamford, and Westport, in Fairfield County.

In New Jersey:--Counties of Bergen, Essex, Hudson, Morris, Passaic, Somerset, and Union; townships of Bethlehem, Clinton, Franklin, Lebanon, Readingston, Tewksbury, and Union, in Hunterdon County; townships of Princeton and West Windsor, and the city of Princeton, in Mercer County; townships of East Brunswick, Lincoln, Madison, Milltown, North Brunswick, Piscataway, Raritan, Roosevelt, Sayreville, South Brunswick, South River, and Woodbridge, boroughs of Dunellen, Highland Park, and Metuchen, and cities of New Brunswick, Perth Amboy, and South Amboy, in Middlesex County; townships of Holmdel, Matawan, and Raritan, in Monmouth County; townships of Hardystown, Lafayette, Sparta, Vernon, and Wantage, in Sussex County; townships of Allamuchy, Franklin, Hope, Independence, Mansfield, Oxford, Washington, and White, in Warren County.

In New York:--Counties of Bronx, Kings, Nassau, New York, Queens, Richmond, Rockland and Westchester; towns of Blooming Grove, Chester, Highland, Monroe, Tuxedo, Warwick, and Woodbury, in Orange County; towns of Carmel, Phillipstown, Putnam Valley, and South East, in Putnam County.

The progress of eradication from the end of December to the beginning of May is shown in the accompanying tabulation, compiled from reports of the Bureau of Entomology and Plant Quarantine for the weeks ending December 28, 1935 and May 2, 1936.

| From end of December to May 2: | Connecticut | New Jersey | New York | Outside | Total |
|---|---|---|---|---|---|
| Trees confirmed | 5 | 244 | 23 | 16 | 288 |
| Trees removed | 6 | 247 | 22 | 21 | 296 |
| Total to May 2: | | | | | |
| Trees confirmed | 138 | 9,421 | 4,789 | 56 | 14,404 |
| Trees removed | 138 | 9,421 | 4,788 | 56 | 14,403 |

## INTERESTING NEW RECORDS

Among specimens received recently from Roderick Sprague were some fungi that apparently have not been reported previously as occurring in this country, and others that have not been recorded for the West. They include:

Ascochyta clematidina (Thuem.) Gloyer on Clematis ligusticifolia, collected by H. S. Jackson at Corvallis, Oregon, July 1910, det. R. Sprague. This seems to be the first report for the West. The Survey has records from New York, New Jersey, West Virginia, Mississippi, Ohio, and Wisconsin.

Colletotrichum fuscum Laub. on Digitalis purpurea, collected at Toledo, Oregon, by F. D. Bailey, April 18, 1912, det. R. Sprague, who states that the disease is fairly common locally, particularly in the humid coastal region. The determination was confirmed by J. A. Stevenson.

Gloeosporium caulivorum Kirch. on Trifolium pratense, collected at Creswell, Oregon, by F. D. Bailey, May 24, 1914, det. R. Sprague. Minnesota, Iowa, and Montana, are the only States west of the Mississippi River from which the Survey has records of this.

Uromyces caryophyllinus (Schr.) Wint. on Dianthus caryophyllus, from Alaska, collected by J. T. Bregger, February 10, 1921. There does not seem to be any previous record from Alaska.

Uromyces scirpi (Cast.) Burr., aecial stage on Daucus carota, collected on the College Farm, Corvallis, Oregon, by the class in plant pathology, April 19, 1914, det. R. Sprague, confirmed by J. A. Stevenson. The Survey has no record of a rust on carrot in this country, and none is listed in Arthur's manual.

S. M. Zeller sent a specimen of Septoria unedonis Rob. on Arbutus unedo, collected on the Oregon State College campus at Corvallis by Roderick Sprague, April 30, 1936. This seems to be the first report of its occurrence in this country.

## A PLANT DISEASE FUNGUS AS THE CAUSE OF ASTHMA

In the May 1 issue of the Market Growers' Journal, E. F. Guba reports that some serious cases of asthma or hay fever caused by the tomato leaf mold fungus (Cladosporium fulvum) have come to his attention. (Tomato mildew causes asthma. Mark. Grow. Jour. 58:221. May 1, 1936).

## MISCELLANEOUS REPORTS ON PLANT DISEASES

Heavy Attack of Mildew on Wheat: On May 1 a 1/40 acre plot of Gasta wheat in the pre-boot stage on the Department of Agriculture Experimental Farm at Arlington, Virginia, was observed to be rather severely affected by powdery mildew (Erysiphe graminis). The reduction in yield was probably about 10 percent. No rusts were noted. (A. G. Johnson).

Loose smut of oats in Mississippi: In counts made in ten fields totalling approximately 150 acres the average amount of loose smut (Ustilago avenae) was 1.5 percent. None was observed in four fields. The highest percentage found in any field was 6 percent. (Paul R. Miller, May 6).

Blight on apple and pear: Paul R. Miller writes that blight (Bacillus amylovorus) is very severe and destructive to pear trees in Mississippi this year. Some of the twigs are killed back at least three feet. It is also prevalent on apple trees in home orchards. (May 6).

P. A. Young sent a specimen of blight on pear from Cherokee County Texas, with the remark that 1 to 5 percent of the twigs were blighted in a ten-acre orchard. (May 2).

Development of Cherry Leaf Spot Fungus in New York: A light discharge of the ascospores of the cherry leaf spot fungus (Coccomyces hiemalis) occurred in four hours from a sour cherry leaf sample gathered in Wayne County May 5. Considerable numbers of the apothecia contain asci in which the spores are not yet formed. (W. D. Mills, May 11, 1936).

## CULTURES WANTED OF GLOEOSPORIUM AND COLLETOTRICHUM

Dr. Richard P. White of the Department of Plant Pathology, New Jersey Agricultural Experiment Station, would like to have cultures or fresh material from which cultures can be obtained of any species of Gloeosporium or Colletotrichum, particularly those collected on ornamentals, pot plants or florist's crops, or deciduous shade trees. Cultures or collections on fruit, vegetable, or fibre plants are also wanted.

## APRIL WEATHER

(The accompanying map (figure 33), showing precipitation, and the discussion of April weather are taken from the Weekly Weather and Crop Bulletin for the week ending May 5.)

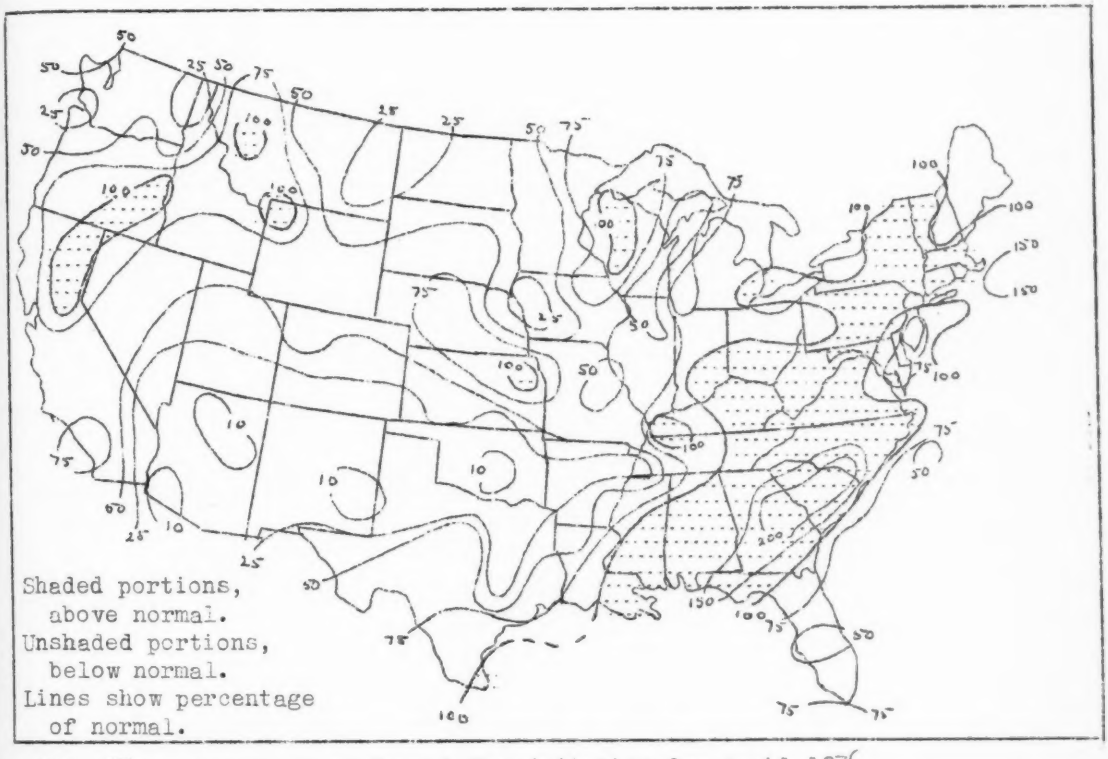


Fig. 35. Percentage of Normal Precipitation for April 1936.

The month of April 1936, was cool for the season over nearly all sections east of the Rocky Mountains and warmer than normal quite generally west of the Rockies. The monthly departures from normal temperature over the eastern two-thirds of the country ranged generally from deficiencies of 1° or 2° in the more southern sections to 4°, or more, in the area from the Lake region westward to the northern Great Plains. Along the Atlantic Coast the month had about normal warmth. West of the Rocky Mountains the plus departures from normal temperature ranged rather generally from 3° to 5° or 6°.

Figure 35 shows the percentage of normal precipitation for the month. This indicates great contrasts between the Southwest and much of the East. Over a large area extending from northern Texas, Oklahoma, and much of Kansas westward to central Utah and Arizona there was less than 25 percent of normal rainfall for the month, with some sections having less than 10 percent of normal; at Oklahoma City there was scarcely enough rainfall to measure during the entire month, the total being about 1 percent of normal. April was dry also in the northern Plains, where considerable sections had only about one-fourth of normal rainfall. On the other hand, most sections east of the Mississippi River had more than normal, although in the middle Atlantic districts the monthly totals were comparatively small.